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ABSTRACT

The booklet is intended to answer employers' common questions regarding safety of disabled workers during emergencies. The importance of prevention is stressed, and the value of good safety habits in decreasing potential danger considered. Adequate and coordinated planning are seen as critical. Evacuation assistance for the physically handicapped, in the form of preselected buddies or monitors, is described. Other evacuation suggestions include lifting and carrying techniques and devices for transporting disabled persons down stairs. Safety considerations for persons with communications limitations and sensory handicaps are noted. It is suggested that safety drills should include disabled persons. (CL)

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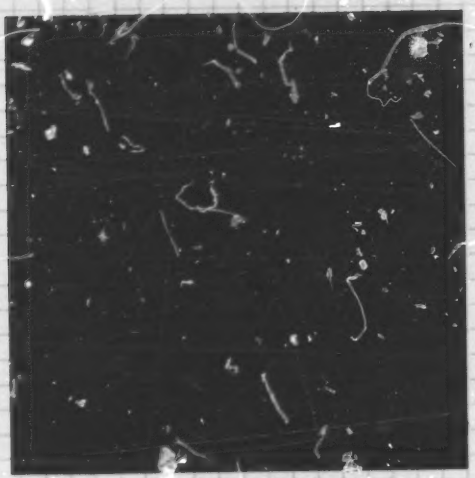
Employers are asking . . .



About the Safety of Handicapped Workers when Emergencies Occur

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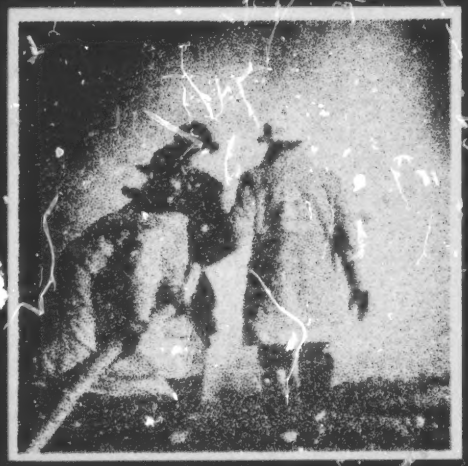


Employers are asking . . .

"What happens when the alarm sounds and the emergency lights start flashing?"

"How do I look after the safety of my handicapped employees?"

"I made my plant accessible to handicapped people by building ramps and widening doorways, but how can I see to their evacuation if a disaster suddenly strikes?"

In recent years, the number of firms committed to employing handicapped job applicants has greatly increased. Employers have become impressed with the business advantages of hiring disabled workers—their job performance has built up the type of record that makes a favorable impact on any firm.

Particularly in the past decade, American business and industry have made extraordinary efforts to recognize the abilities of handicapped persons and to smooth the path for their entry and advancement in the world of work. They have paid greater attention to accommodating the work place and the work situations to the needs of handicapped individuals. They have adapted the work environment and provided in some cases special facilities and equipment, enabling handicapped workers to have access to, and function effectively in, their jobs.

Employers can be justifiably proud of the modifications they have made to provide career opportunities for their handicapped employees. Now, a prevalent concern is for their safety in cases of emergencies. Most building design specifications have emphasized solutions that permit handicapped people to have access to a building or facility with only limited emphasis centered on how to get them out.

The design specifications and standards regarding architectural accessibility to handicapped persons seem to have been developed with little mention of provisions for safe egress should a fire, explosion, power blackout, earthquake or other catastrophe force a mass evacuation.

This area of concern is receiving more concentration from researchers and emergency service personnel, who are studying innovative ways to capitalize on rapidly expanding technology in this direction. However, the fact remains that, until the state of the art attains new levels of sophistication, most employers will have to depend upon conventional methods for evacuating their disabled employees during emergencies.

First Step: Prevention

The intent of building codes is to provide safety to all occupants in case of an emergency. These codes provide a significant level of safety to all employees, including those with disabilities. While additional safeguards may be provided for some disabled employees, it is vitally important to all handicapped individuals that the safety features required by building codes be installed and *maintained*. Special equipment and procedures to protect handicapped persons are effective only if the building is basically safe for everyone.

Good safety practices should be emphasized among all employees without exception. The handling of smoking materials, electrical hazards, flammable liquids, and other hazards need to be identified

for handicapped as well as able-bodied employees. Awareness of, and adherence to, good safety habits can decrease the potential danger that can arise when preventive measures are not stressed in the work place.

Heed the Concerns of the Disabled

Disabled persons have three basic concerns about their safety:

1. That the risk of disaster might not be used as an excuse to exclude them from working in any building.

2. That the level of safety provided handicapped people should equal, as nearly as possible, that traditionally provided able-bodied people.

3. That the unique difficulties they may have in a life threatening situation be anticipated and dealt with before the fact.

Neither the difficulties experienced by some disabled persons nor the risk of emergency, justify keeping disabled persons from the use of any building, whatever floor level. Buildings and work environments are not always constructed to ensure the safety of handicapped or able-bodied workers in the case of a disaster, particularly a fire. Some of these buildings are poorly equipped to provide a safe environment for persons with limitations of mobility, vision, or communication. Nevertheless, safety often can be improved without extensive renovations or the installation of expensive hardware. The key is to pay attention to the essential human requirements.

Improved safety measures for everyone, including early detection systems, two-way communication methods, and provisions of areas of refuge, may be considered long-term approaches to the problem. Improved management procedures to cope with the special needs of all persons can bring immediate improvement to the safety outlook of disabled employees.

Coordinated Planning Required

It would be folly to attempt to draw up an emergency preparedness plan without consulting with, and coordinating with, local agencies, such as the fire department or other emergency services. Emergency preparedness planning is by nature complex and, due in part to the different variables involved in the physical layouts of work places, by no means uniform. The knowledge and experience of professional emergency service personnel need to be tapped to ensure clarity and consistency. Responsibilities need to be clearly defined. Both management and emergency service organizations need a systematic method of identifying and locating handicapped individuals within a plant or office building to facilitate their rescue during emergencies.

It is vital to have a clear understanding through prior planning with the local fire or rescue services regarding evacuation procedures for handicapped employees. Professional opinions can vary among local fire departments as to whether handicapped persons should remain in their rooms, assemble in staging or holding areas to await the arrival of fire fighters or whether other occupants or fellow workers should help with their immediate evacuation. Such details should be worked out and clearly communicated to all parties.

Handicapped employees themselves should participate in the planning process. After all, who knows their needs better? Limited knowledge or understanding on the part of able-bodied persons can result in stereotyped images of handicapped people as a group. This can lead to the perpetuation of myths about assumed limitations, with well-meaning but incorrect measures undertaken to solve problems. Remember the preconceived notion of the boy scout who insistently helped the little old lady across the street? Not everybody desires to get to the other side, or, perhaps more realistically, not everybody needs to be forced.

Evacuation Assistance

When fire or disaster strikes a multi-story building, elevators normally are called to the first floor and cannot be used by fleeing occupants. Physically handicapped people may find themselves in a dilemma. Usually they can move horizontally, either with or without assistance. If they have to move vertically — usually downward — some will find the use of stairs an obstacle that must be overcome.

Here is where your management plan, with approval of your local fire department, must specify whether assistance should await the arrival of rescue personnel or whether trained employees can help in the evacuation. Of course, in cases of dire emergency, there may not be sufficient time to request rescue personnel and wait for their fire trucks or other apparatus to arrive. Mass evacuation may have to be undertaken immediately.

This means that co-workers should be assigned and trained to help any disabled person flee a factory, plant or office building when the alarm sounds. These preselected persons, often called buddies or monitors, take responsibility for ensuring the safety of disabled persons who would be vulnerable without assistance. Alternates, or back-up helpers, also should be named to assume this responsibility during the absence of the designated buddy.

Lifting and Carrying Techniques

The obvious method for transporting down stairs an employee who lacks mobility — in a wheelchair — is not a practical solution unless there are at least two strong persons to control the chair. This is certainly a possibility where there is a large pool of employees concentrated around a work station. However, it is far too strenuous for one person to attempt. There is the possibility that the large wheels of the chair can roll out of control unless sufficient force is exerted on the wheels to act as a brake. Other problems may also arise: the foot rests may come off; hand grips may slide off; the center of gravity of the chair may not allow control to be maintained.

There will be instances when non-ambulatory persons will have to forsake their wheelchairs

during an emergency evacuation. Those co-workers who are assigned to assist them should work out the best method of lifting and carrying them to prevent the risk of physical damage, particularly to persons with paraplegia and quadriplegia who have lost sensation of their extremities and cannot receive warning of pain.

Recently the National Research Council of Canada supported a research study to evaluate the various techniques for evacuating handicapped persons. Testing was accomplished using a large group of disabled people with a wide range of disabilities and limitations. We are fortunate to reap the benefit of the Council's findings.

There are generally four methods whereby one person can carry a non-ambulatory employee. None of the techniques is suitable for all persons. With increasing

PACK-STRAP

PIGGY-BACK

weight of the disabled employee there is increasing difficulty, unless he or she retains a moderate amount of arm strength.

The pack-strap technique, often preferred by health care professionals, restricts the breathing of the person being rescued and may induce leg spasms where there is a history of proneness to this condition.

The piggy-back technique causes less restriction of breathing. Lifting a person for the piggy-back technique can be made easier if done at the top of

CRADLE LIFT

FIREFIGHTER'S LIFT

a flight of stairs where the rescuer can use the handrail for support in lifting. (See illustration).

The cradle lift may be favored by both parties, but is very risky if they are approximately the same size and weight; the rescuer is forced to assume a posture during the lift which can result in injury to the back.

The firefighter's lift requires considerable skill on the part of the rescuer to get the person being rescued into a position where breathing is not restricted.

The Research Council study concludes that if it is necessary to move a person out of a wheelchair and down a flight of stairs, then the piggy-back position is preferable. If, however, the handicapped person has no arm strength, or weighs less than half of the rescuer, then the cradle lift is preferable.

Devices for Transporting

There are several evacuation chairs available for transporting disabled persons down stairs. Tests have shown them to be quite successful, although the size of the disabled person being transported may reduce their efficiency. They also present some problem to disabled employees who must transfer to them from their wheelchairs.

One commercially available chair uses rubber skids to grasp the stairs as it descends, with the pace controlled by the frictional force of the occupant's weight. The seat tilts back to adjust to the slope of the stairs. This type of evacuation chair works better when the stairway has a vinyl or carpeted surface; concrete or steel stairs provide too much grip for easy movement.

To determine which technique is appropriate for evacuating an employee with a certain impairment, it is advisable to discuss the matter with that person. It is also necessary to have an awareness of the limitations resulting from his or her specific disability.

Communication Limitations

A number of workers in a plant may have some form of communication problem, whether deafness, hearing limitations, difficulties in interpreting messages, or difficulties understanding abstract instructions. How can such persons be best approached in an emergency and given instructions to ensure prompt cooperation?

To instill confidence in the person to be evacuated, the buddies or monitors should work out a contingency plan that can take effect when an alarm is set off. Not only do some disabled persons deny their need for assistance, but some communication disorders may cause a person under stress to react in a confused way. To conduct the evacuation effectively, the buddy is advised to use some form of prop, such as a card with the symbol of fire imprinted on it, or an arm band or hard hat such as floor wardens wear. He should persuasively use hand gestures, facial expressions and body language to get his message across. Any verbal message should be kept short, such as "There is a fire (or bomb threat, etc.)" or "You must leave the building," or "Follow me (or follow those other people)."

Some co-workers and supervisors of deaf people have on their own, or their firm's initiative, taken classes in American Sign Language. To find out how a class might be started by employees of your firm, write to: Communication Skills Program, National Association of the Deaf, 814 Thayer Ave Silver Spring, MD 20910.

Sensory Alarms

It is possible to develop an emergency warning signal system for the hearing impaired by supplementing audio signal systems with visual or other sensory information. Usually these are fire alarm and smoke detector systems that activate strobe lights, vibrators, or variable-intensity fans.

High-intensity lights interconnected with the standard fire alarm will flash a warning to persons who cannot hear an emergency signal. It is recommended that these high-intensity strobe lights be timed to flash once per second. Extremely rapid flashes — more than five per second — are suspected of triggering seizures in some susceptible individuals.

For those who do not wish to use the light system, vibrators, installed in appropriate place at

the work station and interconnected with the fire alarm system or a radio receiver, can alert deaf or deaf-blind individuals. Also fans can use the high speed air flow setting as a warning signal if they are wired into the alarm system.

Descriptions and sources from which one may obtain devices which warn the hearing impaired of an emergency can be obtained from: Department of Professional Programs and Services, Alexander Graham Bell Association for the Deaf, Inc., 3417 Volta Place, N.W., Washington, D. C. 20007.

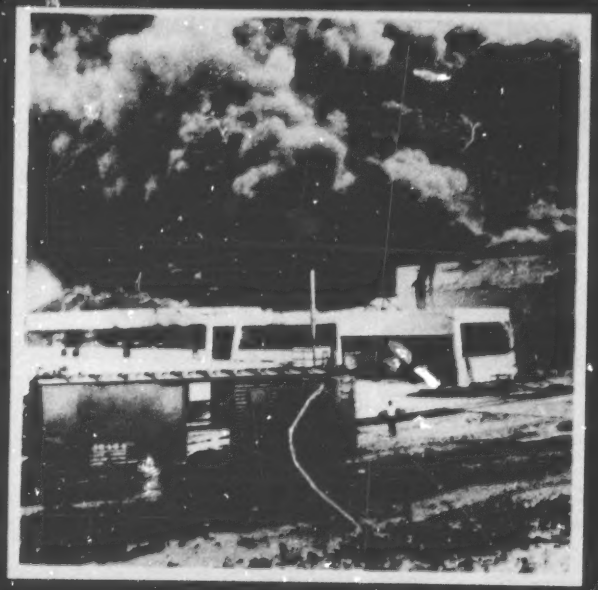
The administrators of Gallaudet College, an institution of higher learning for deaf and hearing impaired students, have developed and implemented a program of fire prevention and control, emergency signals, and evacuation procedures especially suited to deaf persons. For information, write to: Division of Public Services, Gallaudet College, Kendall Green, Washington, D. C. 20002.

The National Technical Institute for the Deaf at Rochester Institute of Technology installed a state-of-the-art visual alarm system in its residence hall when the Institute built its facilities in 1974. A strobe light system warns of fire and other emergency situations that may require evacuation.

NTID, in cooperation with the Rochester, New York, Fire Department, is producing a 25-minute videotape and accompanying booklet containing practical suggestions to help fire service personnel communicate with deaf people.

NTID has also produced a brochure, "Tips You Can Use When Communicating with Deaf Employees," that contains useful information about communicating with deaf people. It includes hints for accommodating deaf employees in the workplace and suggested safety devices.

For more information, write to the National Technical Institute for the Deaf, Rochester Institute of Technology, Public Information Office, One Lomb Memorial Drive, P. O. Box 9887, Rochester, N. Y. 14623.



Employees Who Are Visually Limited

Employees who are blind or only partially sighted may be independent or may be totally dependent on a buddy to lead them to safety during an emergency, according to their level of mobility skills. Even if an employee uses a guide dog, the dog may become disoriented in smoke or other emergency situation. Prior consultation and practice with each employee — using the guide dog, if there is one — will determine what assistance, if any, may be needed.

Instructions relating to evacuation should be furnished to blind employees in Braille, in large type, on tape, or orally. (It should be stressed that oral instruction is considered a reasonable method of communication only if *all*

employees are treated similarly; if sighted employees receive written instructions, then blind employees deserve a more permanent communication medium).

The route of egress should be traveled and studied in detail. The blind persons should be made familiar with the designated places of assembly or refuge. Since blind people depend on acoustical and tactile cues to help with mobility, it might be wise to install some form of aid if the route of egress is intricate, lengthy, or susceptible to environmental changes (smoke, dust, etc.) that could distort sound waves bouncing off walls. One solution is to attach tape or other tactile material along the corridor walls to serve as directional "feelers" along the path of egress.

Another possible answer is an interior design solution. A path of travel having a contrasted surface texture from the adjacent carpeting or tile can provide a blind person with a tactile route which can, through use of a cane, direct the way to safety.

Since blind employees may lose auditory cues during evacuation, some buildings have been fitted with intermittantly placed alarms along the route of egress, to provide a succession of sounds leading to safety.

Safe Area of Refuge

When exiting a multi-story building is not feasible, a place of refuge should be provided that offers safety to the occupants of each upper floor pending their evacuation.

The concept of a safe area of refuge is becoming more common among architects and planners, particularly in design of high rise structures. It involves "compartmentation", or "walling off" the spread of fire and smoke by creating barriers to contain and reduce the area of building damage. At the same time, people inside the building can avoid a life threatening situation by remaining in place until rescue personnel arrive, or the danger is past. Each compartment must have a way out — either stairs or an elevator with protected power.

A safe area of refuge is created by using barriers that either shut or fold across to provide space protected from smoke and fire. Usually these are fire doors closing off corridors. Recent innovations include flexible walls that are automatically activated by smoke and which effectively block off space to give smoke, toxic gas, and flame protection for one or two hours. While these areas are intended for the general population, and disabled people should not be considered their exclusive users, it is important to

account for the square footage occupied by wheelchairs when planning the minimum space needed by the building occupants. (Note: Able-bodied persons are served at 6 square feet/person, and wheelchair occupants are accommodated at 15 square feet/person.)

Another recommendation for consideration is the installation of a two-way communications system within each refuge area. This will permit occupants to send information on their condition and to receive instructions from emergency service personnel.

Emergency instructions for each floor should be posted in a prominent place, preferably in close proximity to the elevator. Ideally, everybody must be able to clear an area likely to be exposed to a fire in a reasonable period of time, regardless of handicaps. A reasonable period of

time is judged by experts as somewhere between 1½ and 5 minutes.

Drills Should Include Disabled Employees

A popular misconception is that people "panic" in largescale emergencies or natural disasters. On the basis of research evidence we now know that much of the conventional thinking about panic and related behavior is wrong. According to E. L. Quarantelli of the Disaster Research Center at Ohio State University, ". . . in both absolute and relative terms, human behavior in disasters in modern, industrial society is fairly good by any reasonable criteria one could use. There is little evidence beyond anecdotal stories, and none of a systematic, comparative and quantitative nature, that suggests that behavior under stress is any more illogical, irrational or dysfunctional than everyday behavior."

In place of this unfounded concern about panic, it is more appropriate to assume that handicapped employees, if they are ambulatory, can be depended upon to observe normal crowd movement procedures when a building must be vacated. They are able to judge their own needs and will make known their requirements if they need assistance for stability or balance while using the stairs. In fact, tests have shown that some semi-ambulant persons are able to move more quickly alone than when aided.

For this reason, disabled employees should be included in all evacuation drills. Sometimes, when a building evacuation drill is planned, they are alerted in advance and told their participation in the drill is at their discretion. This increases the potential hazards already faced by disabled people and does them no favor.

If managers persist in giving them a wink and an invitation to take an early coffee break in the building lobby just prior to the drill alarm, handicapped employees will not get the practice in evacuation techniques that they need. Neither will they get that extra measure of confidence that their situation might require.

After all, a company's emergency plan is only as good as the last time it was tested on all employees.

Checklist

☐ Has allowance been made for the special needs of persons with visual, hearing, mental and mobility disabilities in the firm's emergency plans?

☐ Disabled employees have the best knowledge of their capabilities and their needs. Have their views been taken into account in making up the firm's emergency plans?

☐ Is it possible to know the general locations of disabled employees at all times with reasonable confidence?

☐ Have employees been selected to act as buddies on a one-to-one basis for each handicapped employee requiring assistance in case of emergency? Have they received training?

☐ For blind employees, have all instructions relating to emergencies been distributed in Braille, large type, or cassette tapes? Have you provided a relief map showing the evacuation route from the work station?

☐ Have easily recognizable symbols been adopted to indicate the nature of the evacuation alert to deaf employees?

☐ For persons with severe communication disorders, have co-workers been trained to provide clear instructions regarding the nature of the emergency and the route of evacuation?

☐ Are there accessible areas on each floor that can provide at least a temporary refuge until evacuation can be carried out? Do these refuge areas have escape routes?

☐ To ease their minds, have handicapped employees been advised of the safety features that have been installed in the work place — e.g., sprinklers, fire doors, and smoke control features of the heating and ventilation system?

☐ Has the firm's emergency preparedness plan been coordinated with and approved by the local emergency service personnel?

☐ Are regular evacuation exercises held for all the work force, including those employees who are handicapped? When stairs are a key element in the escape route, are they used during the exit drills?

☐ Can fires be detected by smoke detectors in the early stages of smoldering? Can fires be confined to the floor of origin, or even the room of origin?

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Where to Turn for Additional Help

Several organizations having a particular interest in this topic of emergency planning have produced materials which can guide managers and supervisors in counseling disabled employees about their safety. You are invited to contact these organizations for further information:

Federal Emergency Management Agency
500 C Street, S.W.
Washington, DC 20472

Publication Sales Division
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

National Center for a Barrier Free Environment
Suite 700
1015 15th Street, N.W.
Washington, DC 20005

National Safety Council
444 North Michigan Avenue
Chicago, IL 60611

International Fire Service Training Association
Fire Protection Publications
Oklahoma State University
Stillwater, OK 74078

Center for Fire Research
National Bureau of Standards
Washington, DC 20234

Eastern Paralyzed Veterans Association
432 Park Avenue South
New York, NY 10016

National Office for Life Safety and the Handicapped
1015 15th Street, N.W.
Washington, DC 20005

The Worksite Committee of
The President's Committee on Employment of the Handicapped
Washington, D. C. 20210